Annual Benchmark Report for Services:
Fourth Quarter 2003 to Fourth Quarter 2014

INTRODUCTION

The U.S. Census Bureau produces the *Annual Benchmark Report for Services* to provide revised national estimates of quarterly revenue and expenses for select service industries. (See the **Coverage** section below for more information on the industries included in the Quarterly Services Survey.) The quarterly estimates shown in this report have been revised in a manner that adjusts them to annual revenue and expense estimates from the Service Annual Survey. For more information about the revision procedure, see the **Revisions to Previously Published Quarterly Estimates** section.

We develop the estimates in this report using data from the Quarterly Services Survey (QSS), the Service Annual Survey (SAS), and the Annual Retail Trade Survey (ARTS). For each survey, we mail survey questionnaires to a probability sample of firms located in the United States and having paid employees. Therefore, the quarterly revenue estimates produced from QSS do not include revenue from non-employer firms (i.e., firms without paid employees).

Additional information on QSS and SAS can be found on the Census Bureau website at: http://www.census.gov/services/index.html. Additional information on ARTS can be found on the Census Bureau website at: http://www.census.gov/retail/.

COVERAGE

The estimates in this report are summarized by industry classification based on the 2007 North American Industry Classification System (NAICS).

NAICS groups establishments into industries based on the activities in which they are primarily engaged. This system, developed jointly by the statistical agencies of Canada, Mexico, and the United States, allows for comparisons of business activity across North America.

Detailed information about NAICS can be found on the Census Bureau Web site at: http://www.census.gov/eos/www/naics

Estimates are presented for select industries in the following NAICS sectors (2-digit NAICS codes) and subsectors (3-digit NAICS codes):

2002 NAICS Code	Kind of Business	First Published Quarter
51	Information	2003, Q4
622	Hospitals	2004, Q4
623	Nursing and residential care facilities	
54	Professional, scientific, and technical services	2006, Q3
56	Administrative and support and waste management and remediation services	
484, 492, 493	Selected industries in transportation and warehousing	2009, Q1
532	Rental and leasing services	
621	Ambulatory health care services	
624	Social assistance	
71	Arts, entertainment, and recreation	
81	Other services (except public administration)	
52	Finance and insurance	2009, Q3
22	Utilities	2010, Q1
481, 483, 485, 486, 487, 488	Selected industries in transportation and warehousing	
533	Lessors of nonfinancial intangible assets (except copyrighted works)	
61	Educational services	
531, 721	Real Estate, Accommodation	2012, Q3

REVISIONS TO PREVIOUSLY PUBLISHED QUARTERLY ESTIMATES

The Census Bureau revises the previously published quarterly estimates to:

- Reflect historical corrections to data for the current QSS, SAS, and ARTS samples.
- Introduce results of the 2013 SAS and ARTS.
- Link the previously published estimates from the prior QSS sample to estimates from the current QSS sample.
- Incorporate updates to the seasonal adjustment models and parameters to reflect the revised estimates.

The remainder of this section describes the process used to produce the revised estimates.

See the SAS Technical Documentation for a description of how the SAS estimates are derived. See the ARTS Methodology for a description of how the ARTS estimates are derived.

Quarterly Revenue Estimates

First, corrections are made to data obtained from the current QSS sample for the second quarter of 2012 through the third quarter of 2014. Corrections are made to replace

previously reported data with more accurate data received at a later date or to replace data that has been previously imputed with reported data obtained from the company.

Next, the revenue and expense estimates through the second quarter of 2012 from the prior sample are linked to the estimates starting with the third quarter of 2012 from the current sample. This is possible because two quarters of data, the second and third quarters of 2012, are collected under both samples. The linkage is performed at each detailed NAICS level (including separate breakouts by tax status for Sector 62, where applicable) by multiplying the Horvitz-Thompson estimates from the prior sample by a geometric mean. The geometric mean is computed as the square root of the product of two ratios. The numerators of the ratios are the Horvitz-Thompson revenue estimates for second and third quarter 2012 from the current sample. The denominators of the ratios are the Horvitz-Thompson estimates for second and third quarter 2012 from the prior sample.

After performing the above linkage, the resulting revenue estimates for the fourth quarter of 2007 through the fourth quarter of 2014 are input to the benchmarking program. The benchmarking process revises the estimates for a given detailed NAICS level in a manner that:

- For NAICS 51, 54, 56, 622, and 623, constrains the sum of the four quarterly revenue and expense (where collected) estimates for each year to equal the corresponding census-adjusted, annual estimate for employers obtained from SAS for 2008 through 2013 and leaves estimates for the fourth quarter of 2007 unchanged. Note that this, in turn, leaves all quarters prior to the fourth quarter of 2007 unchanged as well.

- For NAICS 484, 492, 493, 532, 621, 624, 71, and 81, constrains the sum of the four quarterly revenue and expense (where collected) estimates for 2009 through 2013 from QSS to equal the corresponding census-adjusted, annual estimate for employers obtained from SAS. Because data for these NAICS were not collected in QSS prior to the first quarter of 2009, SAS estimates for these NAICS from 2008 are not used in the benchmarking procedure.

- For Sector 52 constrains the sum of the four quarterly revenue estimates for 2010 through 2013 from QSS to equal the corresponding annual revenue estimate for employers obtained from SAS. Because data for this sector were not collected in QSS prior to the third quarter of 2009, SAS estimates for this sector from 2009 and prior years are not used in the benchmarking procedure.

- For NAICS 22, 481, 483, 485, 486, 487, 488, 531, 533, and 61 constrains the sum of the four quarterly revenue estimates for 2010 through 2013 from QSS to equal the corresponding annual revenue estimate for employers obtained from SAS. Because data for these NAICS were not collected in QSS prior to the first quarter of 2010, SAS estimates for these NAICS from 2009 and prior years are not used in the benchmarking procedure.

- For NAICS 721 constrains the sum of the four quarterly revenue estimates for 2013 from QSS to equal the corresponding annual revenue estimate for employers obtained from ARTS. Because data for this subsector were not collected in QSS prior to the third quarter of 2012, ARTS estimates for this subsector from 2012 and prior years are not used in the benchmarking procedure.

- Minimizes the sum of the squared differences between the quarter-to-quarter changes of the input and revised quarterly revenue and expense estimates.

A mathematical result of the benchmarking methodology is that all revised estimates following the end of the last benchmark year (2013) are derived by multiplying the corresponding input estimates by the ratio of the benchmarked-to-input estimate for the last quarter of the last benchmark year. Therefore, for a given detailed NAICS level, a ratio of the benchmarked-to-input estimate for fourth quarter of 2013 is computed. Quarterly revenue estimates after the fourth quarter of 2013 are multiplied by this constant ratio, which is called a carry-forward factor, to derive published quarterly revenue and expense estimates. The carry-forward factor remains the same until the next benchmarking operation.

Likewise, a carry-backward factor is used to derive published quarterly revenue estimates for quarters that precede the earliest annual constraint. The carry-backward factor for a given detailed NAICS level is the ratio of the benchmarked-to-input estimate for the first quarter of the first benchmark year. Currently, there are only two examples of this. In sector 52, the revenue estimates for the third and fourth quarters of 2009 are multiplied by the benchmarked-to-input ratio for the first quarter of 2010. In subsector 721, the revenue estimates for the third and fourth quarters of 2012 are multiplied by the benchmarked-to-input ratio for the first quarter of 2013. Note that for NAICS with estimates going back to 2007, the explicit condition of leaving the estimate from the fourth quarter of 2007 unchanged creates an effective carry-backward factor of 1, leaving all prior estimates unchanged, as well.

Source of Revenue and Other Estimates

Similar to revenue and expenses, the Horvitz-Thompson estimates for other data items from the prior sample are linked to the current sample estimates starting with third quarter of 2012, using a geometric mean involving the item of interest. After applying the geometric mean, a further adjustment may be performed to revise the quarterly estimates from the prior and current samples to ensure appropriate items sum to the quarterly total revenue estimate.

For source of revenue data items, the estimate for a given quarter is multiplied by a ratio, where the numerator is the revised revenue estimate for the quarter, and the denominator is the revenue estimate for the quarter that was input to the benchmarking program. This

procedure ensures the estimated proportion of revenue by source is preserved after the revenue estimates are revised.

For inpatient days and discharges, no further adjustment is made after the application of the geometric mean.

Revised estimates for aggregate industry levels are obtained by summing the revised estimates for the appropriate detailed industries comprising the aggregate.

Seasonally Adjusted Estimates

New seasonal factors are computed using the revised estimates as input to the Census Bureau's X-13ARIMA-SEATS software, version 1.1 build 17. The new factors are used to produce seasonally adjusted quarterly revenue estimates for all available quarters for select industries.

For a list of Frequently Asked Questions about the seasonally adjusted estimates, see http://www.census.gov/services/qss/seasonally_adjusted_faqs.html.

ADDITIONAL INFORMATION

Survey Questionnaires

The Quarterly Services Survey questionnaires can be found on the Census Bureau Web site at: http://www.census.gov/services/qss/get_forms.html.

Dollar Values

All dollar values presented are expressed in current dollars; that is, the estimates are not adjusted to a constant dollar series. Consequently, when comparing estimates to prior years, users also should consider price level changes.

Confidentiality

Title 13 of the United States Code authorizes the Census Bureau to conduct censuses and surveys. Section 9 of the same Title requires that any information collected from the public under the authority of Title 13 be maintained as confidential. Section 214 Title 13 and Sections 3559 and 3571 of Title 18 of the United States Code provide for the imposition of penalties of up to 5 years in prison and up to $250,000 in fines for wrongful disclosure of confidential census information.